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U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF STATISTICS—CIRCULAR LETTER.

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DATES OF SOWING AND HARVESTING.

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The object of this circular letter is to acquaint the public with the partial results of a recent investigation by this bureau as to the dates of sowing and harvesting the principal crops of all countries. The work has been in progress for the last two years, that portion of it which relates to the cereal and forage crops of the United States has been completed, and that relative to truck crops is in process of execution. The results will be published in a series of bulletins, the first of which is now in press.

While this study of cereal and forage crops has revealed many interesting phenomena and has resulted in the collection of valuable data, it is believed that the study of vegetable crops will disclose facts of still greater interest and will advance and coordinate our knowledge of the trucking industry.

In the investigation of dates of sowing and harvesting the cereal and forage crops information was liberally supplied by those correspondents of this department who are engaged in growing these crops, and it is reasonable to expect that those engaged in market gardening will manifest a like interest in the subject of vegetable growing and respond with equal generosity.

A few graphic illustrations and summary tables, reprinted from Bulletin 85 of this bureau—entitled "Seedtime and Harvest: Cereals, Flax, Cotton, and Tobacco: Dates of Planting and Harvesting in the United States east of meridians 102–104, by James R. Covert"—are presented here to show the scope and thoroughness of the investigation. Corn and winter wheat are selected as subjects of illustration; they are widely cultivated, are of great economic importance, and readily lend themselves to the purpose.

Figure 1 shows those sections of the United States wherein, according to this investigation, corn planting begins simultaneously.

Corn planting is first observed on the chart about February 15 of normal years, the first planting taking place in southern Florida and Texas. Fifteen days later corn planting is observed in northern Florida, southern Louisiana, and central Texas, and by May 15 the movement has progressed as far north as southern Maine, New Hampshire, and Vermont, central New York, northern Wisconsin, Minnesota, and North Dakota.

The curves in the lines of the chart are a significant feature. They indicate the result of influences exerted upon planting by topography,

FIGURE 1.—Lines of average dates of the beginning of field-corn planting east of meridians 102–104.

soil conditions, rainfall, and latitude. Sometimes one set of influences prevails, sometimes another. Again, several combined influences may be counterbalanced, as it were, by one controlling influence. For instance, the lines in western Kansas and Nebraska bend slightly northward, instead of abruptly southward, as would be expected in view of their greater altitude. The counterbalancing influence in this case is believed to be the character of the soil which, in the western portion of these States, is sandy and therefore readily dries out and

quickly warms up in spring. The influence of the Great Lakes is shown in the sinuous line bearing the date May 15.

An interesting calculation of the rate of progress of the corn-planting movement was made from data collected in the cereal crop investigation, and is illustrated in the following chart:

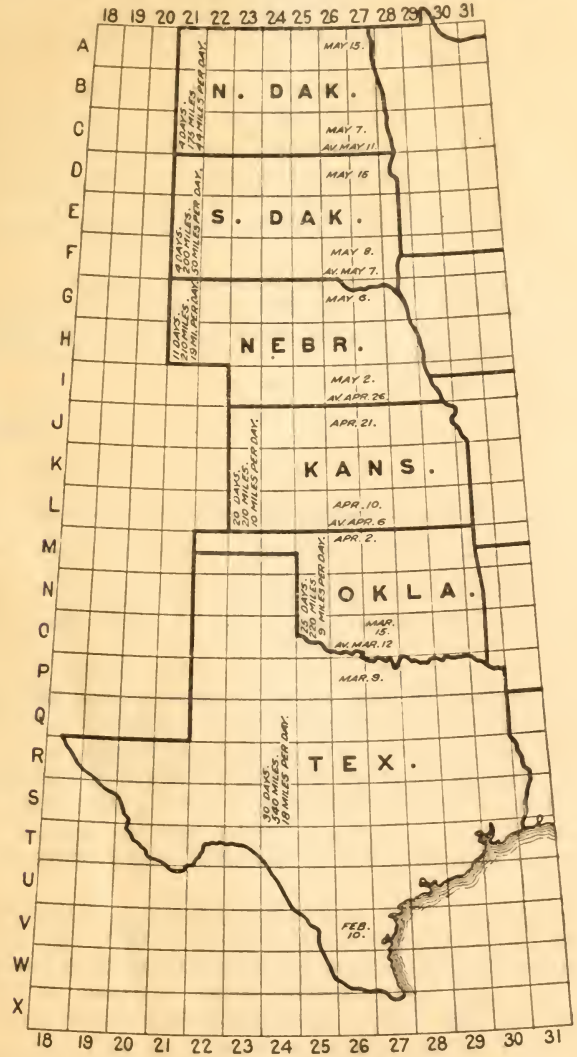

FIGURE 2.—Rate of progress in miles per day of the mean date of the beginning of corn planting, Texas to North Dakota.

In working out the details of this investigation, the entire United States was divided into approximately equal units, each about 70 miles square, and by selecting units which extend in a due north and south line it was comparatively easy to calculate the rate of progress in miles per day of the corn-planting movement.

The following explanation of figure 2 is taken from Bulletin 85, Bureau of Statistics:

At the starting point, near Brownsville, Tex. (fig. 2), planting begins on the average date of February 10. The movement reaches the Texas-Oklahoma line on the mean date of March 12, there being an apparent six-day interval between planting in northern Texas and in southern Oklahoma. The movement, therefore, crosses Texas in 30 days. The actual distance, less the theoretical distance lost by reason of using mean dates, is about 540 miles, and the rate of progress is 18 miles per day.

From the mean date at the Texas-Oklahoma line (March 12) to the mean date at the Oklahoma-Kansas line (April 6) 25 days elapse. The distance from one State line to the other is about 220 miles. Planting, therefore, moves northward through Oklahoma at the rate of 9 miles per day. The rate through Kansas, computed in a similar manner, is 10 miles; through Nebraska, 19 miles; through South Dakota, 50 miles; and through North Dakota, 44 miles per day.

It is a well-known fact that the rate of northward movement of isotherms increases with the distance from the Equator; hence the change from one season to another is more abrupt in the North than in the South and the season of growth progressively shorter.

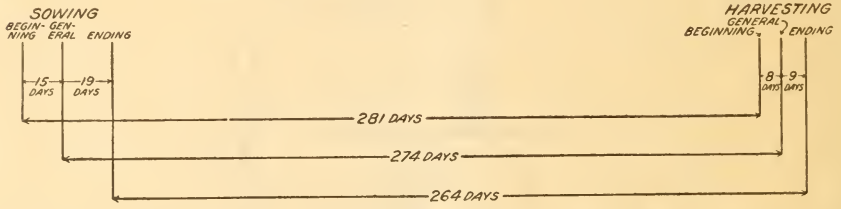

FIGURE 3.—Length of sowing and harvesting seasons of winter wheat. [Mean of 28 States.]

It is also well known that plant growth proceeds more rapidly in northern than in southern latitudes in consequence of the greater number of daylight hours, or hours of possible daily plant growth, in the North.

Now, although the length of both growing period and of growing season decreases as the distance from the Equator increases, yet, because the rate of decrease in length of growing season is greater than the decrease in length of growing period, the latter tends to and eventually does overtake the former in northern latitudes. * * *

By referring to figure 2 it will be seen that the rate of northward movement in South Dakota is not fully maintained in North Dakota. The reason is that before the spring isotherms associated with corn planting have reached southern North Dakota the length of the growing period is already in excess of the growing season, and only a slight setting back of the corn-planting date is possible; farmers are already planting corn nearly as early as possible in that region. Hence the rate of northward progress of the average date of planting though North Dakota decreases as compared with the rate in South Dakota.

The vertical lines on the foregoing chart represent the time when winter wheat sowing and harvesting begin, when they are general, and when they end. The spaces between these vertical lines represent the number of days elapsing from one period to the other. The mean

length of the sowing season for winter wheat, according to this chart, is 34 days; of the harvesting season, 17 days.

The horizontal lines represent the number of days elapsing from the time when winter wheat sowing begins until harvesting begins; the days elapsing from the time when sowing is general until harvesting is general; and the days elapsing from the time when sowing ends until harvesting ends. These results were made possible by returns from several thousand correspondents, representing every agricultural county in each of the 28 States reporting the growing of winter wheat.

An increase in length of sowing season over length of harvesting season is also noted in the case of oats, rye, barley, buckwheat, and flax; but in the case of corn, cotton, and tobacco, the harvesting season is longer than the sowing season, as shown by chart 4.

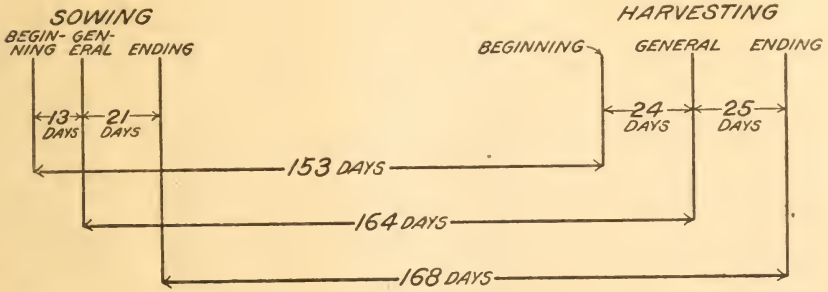

FIGURE 4.—Length of sowing and harvesting seasons of field corn. [Mean of 37 States.]

So far as relates to wheat, oats, rye, barley, buckwheat, and flax, figure 3 is merely an arithmetical illustration of the struggle of a late-sown plant or crop to reach maturity ere it is overtaken by frost. In the case of cotton, artificial selection and cultural methods have, in the lapse of many generations, brought about a prolongation of the fruiting season.

The soil temperature at which corn germinates has been ascertained in numerous tests. The air temperature at which corn planting begins in actual practice, however, has not heretofore been established, but from data assembled in the study of cereal crops it is believed to be approximately 55° F. Omitting certain localities (central Florida, southern Louisiana, and southern Texas) where the mean daily normal temperature does not fall so low as 55° F., the variation from 55° F. for any city is slight. The method by which this result has been obtained is described in Bulletin 85 and Table 28 of that bulletin is reproduced as Table 1 on page 6.

TABLE 1.—*Relationship of average date of the beginning of* **CORN** *planting to isotherm 55°.*

State and city.	Average date of beginning of corn planting.	Mean temperature at foregoing planting date.	State and city.	Average date of beginning of corn planting.	Mean temperature at foregoing planting date.	State and city.	Average date of beginning of corn planting.	Mean temperature at foregoing planting date.
		°F.			°F.			°F.
Maine:			South Carolina:			Missouri—Con.		
Eastport	May 17	47	Charleston	Mar. 15	57	Kansas City	Apr. 18	55
Portland	May 19	54	Columbia	Mar. 11	52	St. Louis	Apr. 16	56
New Hampshire:			Georgia:			Springfield	Apr. 3	51
			Atlanta	Mar. 18	53	North Dakota:		
Concord	May 16	56	Augusta	...do	56	Bismarck	May 13	54
Vermont:			Macon	Mar. 14	54	Devils Lake	May 20	54
Burlington	May 17	55	Savannah	Mar. 7	56	Williston	May 15	54
Northfield	...do	54	Thomasville	Mar. 3	58	South Dakota:		
Massachusetts:			Florida:			Huron	May 8	54
Boston	May 11	55	Jacksonville	Feb. 27	59	Pierre	May 6	56
Nantucket	May 6	50	Jupiter	Feb. 15	66	Rapid City	May 5	51
Rhode Island:			Key West	...do	71	Yankton	May 7	57
Block Island	May 10	51	Pensacola	Mar. 13	60	Nebraska:		
Providence	...do	56	Tampa	Feb. 13	61	Lincoln	Apr. 29	57
Connecticut:			Ohio:			North Platte	May 1	55
Hartford	...do	55	Cincinnati	Apr. 26	58	Omaha	May 5	59
New Haven	...do	56	Cleveland	May 9	56	Valentine	...do	53
New York:			Columbus	May 5	59	Kansas:		
Albany	May 12	58	Sandusky	May 2	54	Concordia	Apr. 21	56
Binghamton	May 10	55	Toledo	May 6	56	Dodge City	Apr. 5	51
Buffalo	May 16	55	Indiana:			Topeka	Apr. 21	56
Canton	May 12	55	Evansville	Apr. 28	61	Wichita	Apr. 10	55
Ithaca	...do	56	Indianapolis	Apr. 29	57	Kentucky:		
New York	May 8	57	Illinois:			Lexington	Apr. 17	54
Oswego	May 12	53	Cairo	Apr. 25	61	Louisville	Apr. 18	57
Rochester	May 11	55	Chicago	May 5	53	Tennessee:		
Syracuse	May 12	56	La Salle	...do	57	Chattanooga	Mar. 31	56
New Jersey:			Peoria	May 2	57	Knoxville	Mar. 29	52
Atlantic City	May 2	53	Springfield	Apr. 30	58	Memphis	Mar. 27	56
Cape May	...do	54	Michigan:			Nashville	Apr. 1	54
Pennsylvania:			Alpena	May 16	50	Alabama:		
Erie	May 11	56	Detroit	May 11	56	Anniston	Mar. 15	52
Harrisburg	May 2	57	Grand Haven	May 8	52	Birmingham	...do	56
Philadelphia	Apr. 26	55	Grand Rapids	May 15	59	Mobile	Mar. 8	57
Pittsburgh	May 7	60	Houghton	May 28	54	Montgomery	Mar. 11	57
Scranton	May 14	58	Marquette	May 15	49	Mississippi:		
Maryland:			Port Huron	May 11	52	Meridian	Mar. 10	55
Baltimore	Apr. 29	58	Wisconsin:			Vicksburg	Mar. 5	55
Virginia:			Green Bay	May 18	55	Louisiana:		
Cape Henry	Apr. 10	53	La Crosse	May 9	57	New Orleans	Mar. 1	59
Lynchburg	Apr. 20	57	Madison	May 7	54	Shreveport	Feb. 28	54
Mt. Weather	Apr. 27	53	Milwaukee	May 13	52	Texas:		
Norfolk	Apr. 10	54	Minnesota:			Abilene	Mar. 5	50
Richmond	Apr. 14	57	Moorhead	...do	54	Corpus Christi	Feb. 10	57
Wytheville	Apr. 21	54	St. Paul	May 11	56	Fort Worth	Feb. 27	52
West Virginia:			Iowa:			Galveston	Feb. 18	56
Elkins	May 1	54	Charles City	May 6	56	Palestine	Feb. 23	53
Parkersburg	Apr. 27	57	Davenport	May 1	57	San Antonio	Feb. 21	56
North Carolina:			Dubuque	May 4	57	Taylor	...do	53
Asheville	Apr. 12	53	Keokuk	May 1	58	Oklahoma:		
Charlotte	Apr. 4	56	Sioux City	May 4	57	Oklahoma	Apr. 3	56
Hatteras	Mar. 23	53	Missouri:			Arkansas:		
Raleigh	Mar. 29	54	Columbia	Apr. 17	55	Fort Smith	Mar. 19	52
Wilmington	Mar. 20	55	Hannibal	...do	54	Little Rock	Mar. 15	52

Mean temperature for the 127 cities, 55°.

The following table is one of several useful compilations resulting from the study of dates of sowing and harvesting the cereal crops of this country:

TABLE 2.—*Mean dates of sowing and harvesting* **WINTER WHEAT** *in the United States, by States, in chronological order.*

State.	Sowing.			State.	Harvesting.		
	Beginning.	General.	Ending.		Beginning.	General.	Ending.
Vermont	Aug. 7	Aug. 27	Sept. 8	Texas	May 29	June 9	June 22
South Dakota	Aug. 31	Sept. 16	Oct. 10	Georgia	June 1	...do	June 21
Pennsylvania	Sept. 2	Sept. 15	Oct. 4	South Carolina	June 3	June 13	June 24
Minnesota	Sept. 3	Sept. 13	Sept. 21	Alabama	June 4	...do	June 23
Michigan	...do	Sept. 14	Sept. 26	Arkansas	June 6	June 14	June 24
Iowa	Sept. 4	Sept. 15	Sept. 27	Tennessee	June 10	June 20	June 30
New York	...do	Sept. 18	Oct. 2	North Carolina	June 11	June 19	June 26
Wisconsin	Sept. 5	Sept. 14	Sept. 25	Oklahoma	June 12	June 23	July 7
Nebraska	...do	Sept. 17	Oct. 6	Kentucky	June 17	June 24	July 3
Indiana	Sept. 8	Sept. 21	Oct. 7	Virginia	June 20	June 26	Do.
Missouri	Sept. 9	Sept. 23	Oct. 10	Missouri	...do	June 27	July 6
Ohio	Sept. 11	Sept. 24	...do	Delaware	June 22	June 24	June 30
Kansas	...do	Sept. 26	Oct. 24	Maryland	June 23	June 28	July 7
Illinois	Sept. 12	Sept. 24	Oct. 8	Illinois	June 24	June 30	Do.
New Jersey	...do	...do	...do	West Virginia	June 25	July 2	July 10
Oklahoma	Sept. 13	Sept. 30	Oct. 29	Indiana	June 26	July 3	Do.
West Virginia	Sept. 15	Sept. 28	Oct. 15	Kansas	...do	July 4	July 14
Maryland	Sept. 18	Oct. 1	Oct. 20	Ohio	June 29	July 6	July 13
Kentucky	Sept. 19	Oct. 5	Oct. 25	New Jersey	July 3	July 7	July 16
Virginia	Sept. 20	Oct. 3	Oct. 21	Iowa	...do	July 11	July 15
Tennessee	Sept. 22	Oct. 10	Nov. 14	Pennsylvania	July 4	July 10	July 18
Arkansas	...do	Oct. 11	Nov. 6	Nebraska	July 6	July 13	July 21
Texas	Sept. 30	Oct. 20	Nov. 18	New York	July 10	July 19	July 28
Delaware	Oct. 3	Oct. 10	Oct. 26	South Dakota	July 14	July 22	July 31
Alabama	Oct. 4	Oct. 27	Nov. 22	Minnesota	July 15	July 23	July 29
South Carolina	Oct. 13	Nov. 5	Dec. 8	Michigan	...do	...do	July 31
North Carolina	Oct. 14	Oct. 26	Nov. 15	Wisconsin	July 16	July 22	July 28
Georgia	...do	Nov. 5	Nov. 28	Vermont	July 22	Aug. 2	Aug. 18

Mean length of sowing season, 34 days. Mean length of harvesting season, 17 days.

Turning now from the cereal crops, the study of which has been completed, to the vegetable crops, the study of which is about to be undertaken, a few results may be mentioned. Centers of production will be mapped, the times of sowing and harvesting and regions which compete with one another will be determined, and the range of crops and length of growing season will be ascertained.

Distribution is a serious problem not yet fully solved by market gardeners. It is desired to make this compilation of practical value in the economic distribution of truck crops and to bring producer and consumer into closer touch with one another.

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Approved:

JAMES WILSON,
Secretary of Agriculture.

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